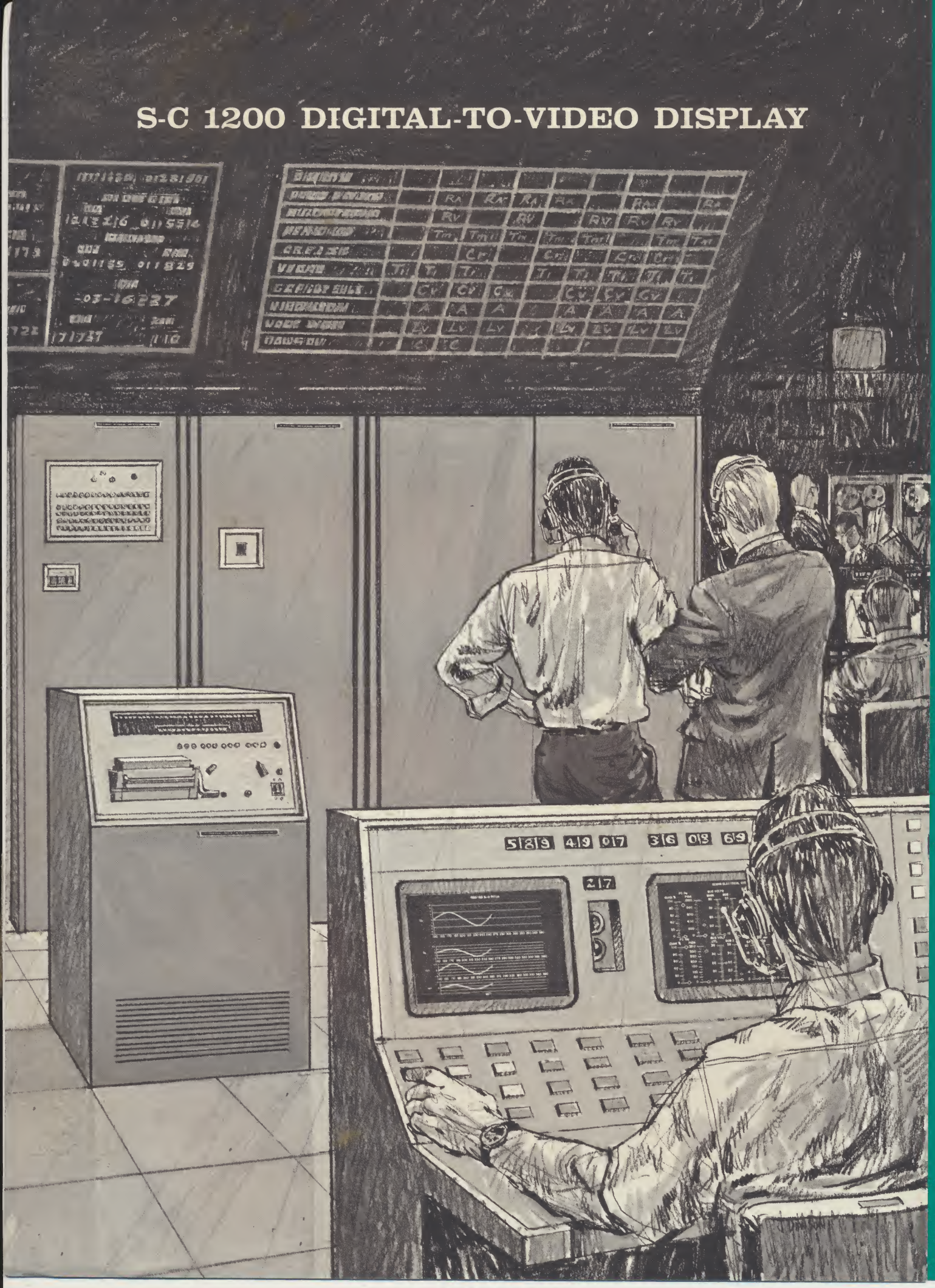
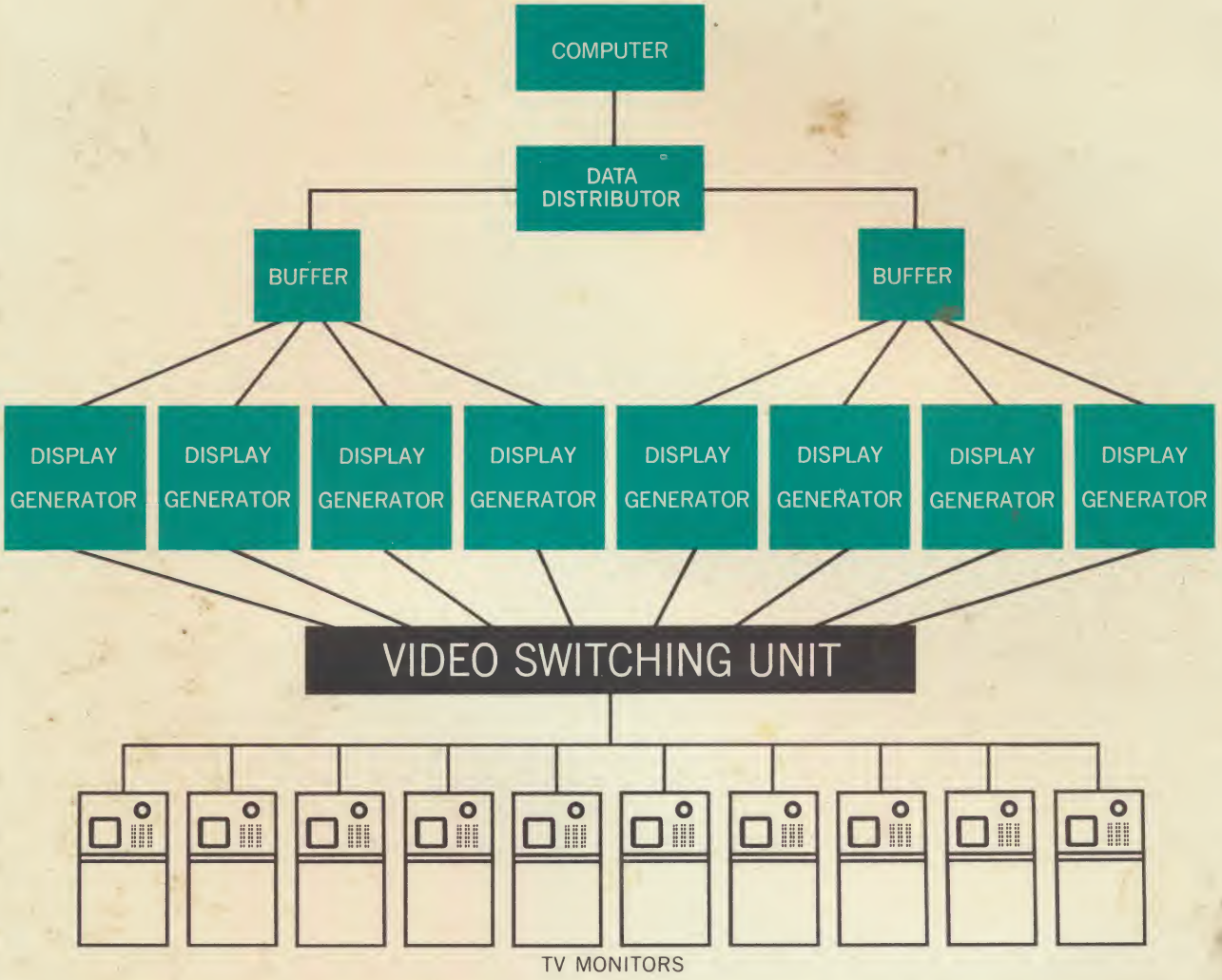
S-C 1200 DIGITAL-TO-VIDEO DISPLAY



STROMBERG-CARLSON

S-C 1200 DIGITAL-TO-VIDEO DISPLAY



A completely integrated display system, the S-C 1200 translates digital codes generated by computers into high resolution video which can be presented on remote television monitors. The diagram above shows the operation of the S-C 1200. Computer generated data is fed directly to the data distributor. From there the data is sent to the appropriate buffer. Data is next passed on to the display generators by the buffers. The video switching unit enables the operators at remote TV monitors to select whatever channel they wish to view.

Data Distributor

Buffer

Display Generator

Test Generator

TV Monitor

HIGH RESOLUTION COMPUTER DISPLAY AT REMOTE STATIONS

WHAT IS THE S-C 1200?

The S-C 1200 system is designed to translate digital data from a computer into a visual format for display on the screen of one or more remote television consoles. Using this system, 1 to 64 display generators may be used. Each generator can present a separate channel of information.

The techniques employed are based on proven equipment produced for more than ten years by Stromberg-Carlson. Systems using these techniques have been installed in a major display system for the National Aeronautics and Space Administration's Integrated Mission Control Center at the Manned Spacecraft Center in Houston, Texas.

APPLICATIONS & ADVANTAGES

The S-C 1200 is suitable for any system requiring display of data at a series of points remote from the computer. For example, industrial use would include management control centers. In business organizations such as banks and insurance companies, it can be used for record inquiry systems. Government agency applications include air, land and sea surveillance systems. It is an extremely economical approach because it is far less expensive to display data on a series of TV monitors than on a series of direct view displays. In the S-C 1200 a single display generator can drive up to 100 or more video monitors.

Also, the technique makes it possible to present many channels of information to each monitor. For example, digital data from a space launch may occupy one or more channels while visual observation of the launch may occupy another channel.

For systems already using video display, the S-C 1200 can present computer-generated data on the existing TV monitors. Another advantage is that the output from the display generators in the S-C 1200 can be sent to remote locations by standard video transmission systems.

HOW THE S-C 1200 WORKS

Basically the S-C 1200 operates by presenting computer-generated data on the face of a special cathode ray tube. From there it is transmitted by video camera to the monitor. The data distributors, buffers and display generators in the system are products of Stromberg-Carlson and are in service in numerous data handling applications.

Data Distributor... In operation the data distributor directs computer information to specific areas within the memory core of the buffer. The data distributor also checks to see that information has been correctly placed in the buffer by reading out the data and comparing it against the input from the computer. The data distributor is made up of duplexed circuits so if the comparison fails, alternate circuits are automatically switched into the system for doubled reliability. The distributor cabinet contains an operational status display which indicates the status of all major assemblies within the system, including itself.

Buffers... Display data is continuously repeated to the display generator by the buffer which consists of a core memory, selection circuitry, unload circuitry and command structure. Because of its high speed the buffer can handle one to four display units simultaneously. Data can be shared by one or more display generators. In case of failure, select switches in each buffer permit interchanging buffers on the same basis as tape units on a data channel without requiring reprogramming.

This capability allows for routine maintenance and testing with a minimum loss of display time. The buffer select function allows control of as many as sixteen buffer memories from a single data distributor.

Display Generator... Heart of this unit is the CHARACTRON® Shaped Beam Tube (see figure on back page). This unique cathode ray tube produces letters, numbers, symbols and lines of any kind on its face. It can also produce complex figures or curves by joining line segments (vectors) together.

In the tube, a stencil-like matrix, with alphanumeric and symbolic characters etched through it, is placed in front of an electron gun. A stream of electrons emitted from the gun is extruded through a selected character in the matrix. When this shaped beam impinges on the phosphor-coated face of the tube, the character is reproduced.

Because the characters are actually cut from the beam, the highest available resolution is achieved. Therefore, the resolution of the complete system is limited only by the resolution of the video camera and monitor.

A 96-character matrix is provided which includes small and capital letters, desired symbols and one large aperture. In addition to the two standard character sizes available in the 96-character matrix, the system has the further capability to vary the size of any of the characters or symbols. By focusing the entire electron beam through the large aperture, the tube may be used in the spot writing mode, thereby allowing an infinite number of symbols to be generated.

A film projector is provided so that repetitious background data such as graph lines, business forms, etc., may be superimposed under program control on the tube image without requiring extensive computer time. Other components of the display generator include associated selection and deflection circuits, type setting logic, vector generating circuitry and a beam splitting mirror to combine images from the slide projector and the CHARACTRON Shaped Beam Tube. Fifteen hundred symbols may be displayed flicker-free.

The display generator will operate under program control in the following modes of operation:

a. TYPEWRITER — Successive characters in any of eight sizes are placed adjacent to each other in the manner of a typewriter. Character sizes may be mixed in any one line under program control.

b. PLOT RANDOM — Any character in any of the eight sizes can be plotted at a random position on the face of the CHARACTRON Shaped Beam Tube.

c. PLOT SEQUENTIAL — Similar to the PLOT RANDOM mode but faster because each character must be located within a limited distance from the preceding character.

d. VECTOR RANDOM — A vector is drawn from any specified starting point and may have a maximum length of one-eighth of the frame dimensions in both X and Y directions.

e. VECTOR SEQUENTIAL — Similar to VECTOR RANDOM but faster because each start point of a vector must be located within a limited distance from the stop point of the last vector.

Video System... All data presented on the face of the display generator are scanned by a television camera trained on the tube and transmitted to the video switching unit. From there the desired channels of information are fed to monitors requesting that channel. Existing video

STROMBERG-CARLSON S-C 1200 DIGITAL-TO-VIDEO DISPLAY

monitors may be tied into the system or monitors most suited to the application may be employed.

Test Generator...This mobile unit, which may be used to test and debug the system, consists of a punched card program generator. Test programs are designed to isolate faults quickly using cathode-ray oscilloscopes, built-in indicators, or a display generator. Test programs are easily changed by inserting different punched cards.

VARIATIONS

Multiple Channels per Display Generator... Several modifications are available to suit the S-C 1200 system to specific requirements. For example, each CHARACTRON Shaped Beam Tube in each display generator can present up to four separate display areas on its face, each with different data. By training a separate camera on each frame, the number of channels that can be handled is quadrupled.

Color Video... Using the above system, each of the camera signals may be used as a color to be displayed on color monitors.

Video Scan Rate...The system can be modified for use with any appropriate video scan system.

Microfilm/Hardcopy Recording...This digital-to-video display can also be adapted to use microfilm cameras in addition to, or in lieu of, the video cameras. With this accessory, it is a simple matter to make a permanent record of any data that must be retained. Another option permits printing of paper copies of output, if desirable. Color film recording is possible using an additive color filter system.

Direct View Display... Direct view displays may be utilized in lieu of TV monitors, or be used in parallel with the above microfilm/hardcopy recording system, thereby allowing recording of selected displays.

Buffer Size...Standard buffer size is 4096 36-bit words. Buffer capacity may be doubled to permit the use of additional display generators.

Off-Line Magnetic Tape...The data distributor may be modified to accept data from a magnetic tape unit.

Interface... Slight changes to the data distributor permit interface with virtually any existing data processing system.

SPECIFICATIONS

Data Distributor

Size: 74½" high, 24" wide, 36½" deep

Weight: Less than 650 lbs.

Power: Input Voltage 120 volts a-c
Input Frequency 60 cycles
Input Power 800 watts

Environment: Air Conditioning;
Controlled Humidity

Buffers

Size: 74½" high, 24" wide, 36½" deep

Weight: Approximately 662 lbs.

Power: Input Voltage 120 volts a-c
Input Frequency 60 cycles
Input Power 820 watts

Environment: Air Conditioning;
Controlled Humidity

Display Generators

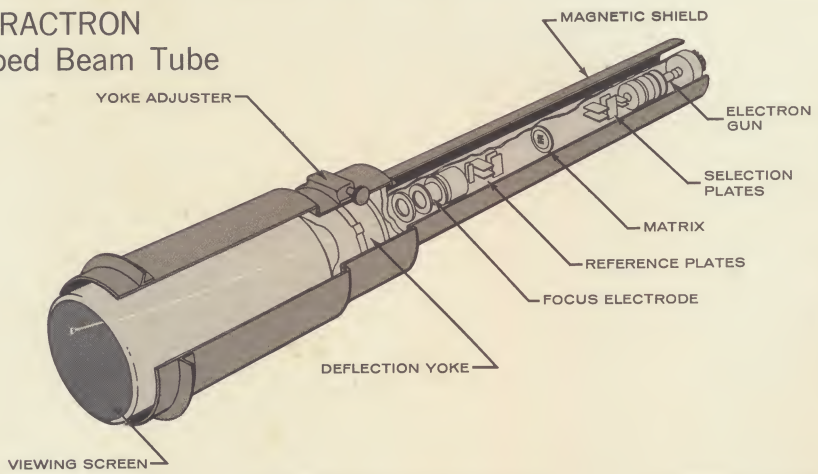
Size: 74½" high, 46½" wide, 36½" deep

Weight: Less than 1600 lbs.

Power: Input 120 volts a-c
Input Frequency 60 cycles
Input Power 2400 watts

Environment: Air Conditioning;
Controlled Humidity

CHARACTRON
Shaped Beam Tube



Etched matrix containing
96 characters and symbols.

STROMBERG-CARLSON
CORPORATION
DATA PRODUCTS-SAN DIEGO
Phone 298-6131, Area Code 714
P.O. Box 2449, San Diego, California 92112

PRINTED IN THE USA

C-20A/4-65/5M